What is claimed is:

1. An apparatus comprising:

   a data packet generator to generate a data packet including at least one of a compatibility preamble field, two or more training fields and a physical layer convergence protocol header that includes bit and power loading information, and wherein at least some of the compatibility preamble field, the two or more training fields and the physical layer convergence protocol header are encoded with a predetermined code and modulated by a predetermined modulation scheme.

2. The apparatus of claim 1, wherein the compatibility preamble field is subdivided in time into a short combined preamble, a long combined preamble and a combined signal field.

3. The apparatus of claim 2 wherein the short combined preamble comprises:

   two or more short preambles transmitted over two or more sub-channels,

   wherein one of the two or more short preambles is phase rotated relative to other short preambles in other sub-channels.

4. The apparatus of claim 2 wherein the long combined preamble comprises:

   two or more long preambles transmitted over two or more sub-channels,

   wherein one of the two or more long preambles is phase rotated relative to other long preambles in other sub-channels.

5. The apparatus of claim 2 wherein the combined signal field comprises:

   two or more signal fields transmitted over two or more sub-channels, wherein one of the two or more signal fields is phase rotated relative to other signal fields in other sub-carriers.

6. The apparatus of claim 1, wherein the two or more training fields comprise:

   a prefix training field and a postfix training field, both fields having substantially the same format, transmitted over two or more sub-channels of a channel.

7. The apparatus of claim 1, wherein the data packet comprises at least one data field fragmented into two or more fragments separated by at least one middle-fix training field.

8. The apparatus of claim 6, wherein the two or more training fields comprises :

   a middle-fix training field having substantially the same format as the prefix training field and the postfix training field.

9. The apparatus of claim 7, comprising:

   a modulator to modulate the two or more fragments using two or more modulation schemes, respectively.

10. The apparatus of claim 9, wherein the modulator is able to modulate a first fragment of the two or more fragments using a first modulation scheme and a second fragment of the two or more fragments using a second modulation scheme.

11. The apparatus of claim 9 comprising:

   an encoder to encode a first fragment of the two or more fragments by a first code and a second fragment of the two or more fragments by a second code.

12. The apparatus of claim 1 comprising:

   a predictor to predict long-term characteristics of a communication channel based on information received from at least one of the two or more training fields.

13. A method comprising:

generating a data packet including two or more fields selected from at least one of a compatibility preamble field and two or more training fields, wherein at least some of the compatibility preamble field and two or more training fields are encoded with a predetermined code and modulated by a predetermined modulation scheme.

14. The method of claim 13, comprising:

dividing two or more long preambles of a long combined preamble of a compatibility preamble field into two or more sub-channels; and

rotating a phase of one of the long preambles in one of the sub- channels.

15. The method of claim 14, comprising:

dividing two or more long preambles of the long combined preamble of the compatibility preamble field into two or more sub-channels; and

rotating a phase of one of the long preambles in one of the sub- channels.

16. The method of claim 14, comprising:

dividing two or more signal fields of a combined signal field of the compatibility preamble field into two or more sub-channels; and

rotating a phase of one of the signal fields in one of the sub-channels.

17. The method of claim 13, wherein generating comprises:

fragmenting a data field of the data packet into at least first and second fragments; and

separating the first and second fragments by a training field of two or more training fields.

18. The method of claim 17 comprising:

modulating first and second sub-carriers of the first and second fragments with first and second modulation schemes, respectively.

19. The method of claim 17 comprising:

encoding the first and second fragments by first and second encoding schemes, respectively.

20. The method of claim 17 comprising:

predicting long-term characteristics of a communication channel based on information received from at least one of the two or more training fields.

21. A wireless communication device comprising:

a data packet generator to generate a data packet including at least one of a compatibility preamble field, two or more training fields and a physical layer convergence protocol header that includes bit and power loading information, and wherein at least some of the compatibility preamble field, the two or more training fields and the physical layer convergence protocol header are encoded with a predetermined code and modulated by a predetermined modulation scheme; and

a dipole antenna to receive and transmit the data packet.

22. The wireless communication device of claim 21, wherein the compatibility preamble field is subdivided in time into a short combined preamble, a long combined preamble and a combined signal field.

23. The wireless communication device of claim 22 wherein the short combined preamble comprises:

two or more short preambles subdivided into two or more sub-channels,

wherein and one of the two or more short preambles is phase rotated relative to other short preambles in other sub-channels.

24. The wireless communication device of claim 22 wherein the long combined preamble comprises:

two or more long preambles subdivided into two or more sub-channels,

wherein one of the two or more long preambles is phase rotated relative to other long preambles in other sub-channels.

25. The wireless communication device of claim 22 wherein the combined signal field comprises:

two or more signal fields wherein, at least one signal field is subdivided into two or more sub-channels and one of the two or more short preambles is phase rotated relative to other short preambles in other sub-channels.

26. The wireless communication device of claim 21, wherein the two or more training fields comprise:

   a prefix training field and a postfix training field, both fields having substantially the same format, transmitted over two or more sub-channels of a channel.

27. The wireless communication device of claim 21, wherein the data packet comprises at least one data field fragmented into two or more fragments separated by at least one middle-fix training field.

28. The wireless communication device of claim 26, wherein the two or more training fields comprises :

   a middle-fix training field having substantially the same format as the prefix training field and the postfix training field.

29. The wireless communication device of claim 27, comprising:

   a modulator to modulate the two or more fragments using two or more modulation schemes, respectively.

30. The wireless communication device of claim 29, wherein the modulator is able to modulate a first fragment of the two or more fragments using a first modulation scheme and a second fragment of the two or more fragments using a second modulation scheme.

31. The wireless communication device of claim 29 comprising:

an encoder to encode a first fragment of the two or more fragments by a first code and a second fragment of the two or more fragments by a second code.

32. A wireless communication system comprising:

two or more wireless communication devices wherein at least one of the two or more communication devices include:

a data packet generator to generate a data packet including at least one of a compatibility preamble field, two or more training fields and a physical layer convergence protocol header that includes bit and power loading information, and wherein at least some of the compatibility preamble field, the two or more training fields and the physical layer convergence protocol header are encoded with a predetermined code and modulated by a predetermined modulation scheme.

33. The wireless communication system of claim 32, wherein the compatibility preamble field is subdivided in time into a short combined preamble, a long combined preamble and a combined signal field.

34. The wireless communication system of claim 33 wherein the short combined preamble comprises:

two or more short preambles subdivided into two or more sub-channels,

wherein and one of the two or more short preambles is phase rotated relative to other short preambles in other sub-channels.

35. The wireless communication system of claim 33 wherein the long combined preamble comprises:

two or more long preambles subdivided into two or more sub-channels,

wherein one of the two or more long preambles is phase rotated relative to other long preambles in other sub-channels.

36. The wireless communication system of claim 33 wherein the combined signal field comprises:

two or more signal fields wherein, at least one signal field is subdivided into two or more sub-channels and one of the two or more short preambles is phase rotated relative to other short preambles in other sub-cannels.

37. The wireless communication system of claim 32, wherein the two or more training fields comprise:

   a prefix training field and a postfix training field, both fields having substantially the same format, transmitted over two or more sub-channels of a channel.

38. The wireless communication system of claim 32, wherein the data packet comprises at least one data field fragmented into two or more fragments separated by at least one middle-fix training field.

39. The wireless communication system of claim 36, wherein the two or more training fields comprises :

   a middle-fix training field having substantially the same format as the prefix training field and the postfix training field.

40. The wireless communication system of claim 39, comprising:

   a modulator to modulate the two or more fragments using two or more modulation schemes, respectively.

41. The wireless communication system of claim 40, wherein the modulator is able to modulate a first fragment of the two or more fragments using a first modulation scheme and a second fragment of the two or more fragments using a second modulation scheme.

42. The wireless communication system of claim 40 comprising:

   an encoder to encode a first fragment of the two or more fragments by a first code and a second fragment of the two or more fragments by a second code.